IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A current-in-plane (CIP) GMR sensor, comprising:

a GMR sensor stack having a width selected to provide a predetermined track width;

a spacer layer, having a width substantially equal to the spin valve stack, formed over a free-layer of the GMR sensor stack; and

an in-stack biasing layer disposed over the spacer and having a width substantially equal to the width of the GMR sensor stack.

2. (Currently Amended) The CIP GMR sensor of claim 1, wherein the in-stack biasing layer comprises materials selected from the group consisting of NiFe, CoFe, NiFeCr, ~~NiFe$_x$ and CoFe$_x$~~ NiFeX and CoFeX.

3. (Currently Amended) The CIP GMR sensor of claim 1 further comprising ~~lead layers formed on either side of the GMR sensor stack~~ an antiferromagnetic layer formed on both sides of the in-stack biasing layer to provide an off-track bias layer.

4. (Currently Amended) The CIP GMR sensor of claim 3, further comprising lead layers formed on either side of the GMR sensor stack, wherein the lead layers comprises a layer of Rhodium disposed adjacent to the GMR sensor stack~~,~~ and a Tantalum layer formed over the layer of Rhodium ~~and a layer of Platinum-Manganese formed over the layer of Tantalum~~.

5. (Currently Amended) The CIP GMR sensor of claim [[4]] 3, wherein the antiferromagnetic layer comprises a layer of Platinum-Manganese ~~is formed adjacent a portion of the in-stack bias layer~~.

6. (Currently Amended) The CIP GMR sensor of claim 3, wherein the in-stack biasing layer comprises a bias layer formed only over the spacer and a coupling layer formed over the bias layer and the antiferromagnetic layer ~~of Platinum-Manganese~~.

7. (Currently Amended) The CIP GMR sensor of claim 6, wherein the bias layers and coupling layer each comprise a material selected from the group consisting of NiFe, CoFe, NiFeCr, ~~$NiFe_x$ and $CoFe_x$~~ NiFeX and CoFeX.

8. (Original) The CIP GMR sensor of claim 1 further comprising a cap layer formed over the in-stack bias layer.

9. (Currently Amended) A magnetic storage system, comprising:

a magnetic storage medium having a plurality of tracks for recording of data; and

a current-in-plane (CIP) GMR sensor maintained in a closely spaced position relative to the magnetic storage medium during relative motion between the magnetic transducer and the magnetic storage medium, the CIP GMR sensor further comprising:

a GMR sensor stack having a width selected to provide a predetermined track width;

a spacer layer, having a width substantially equal to the spin valve stack, formed over a free-layer of the GMR sensor stack; and

an in-stack biasing layer disposed over the spacer and having a width substantially equal to the width of the GMR sensor stack.

10. (Currently Amended) The magnetic storage of claim 9, wherein the in-stack biasing layer comprises materials selected from the group consisting of NiFe, CoFe, NiFeCr, ~~$NiFe_x$ and $CoFe_x$~~ NiFeX and CoFeX.

11. (Currently Amended) The magnetic storage of claim 9 further comprising ~~lead layers formed on either side of the GMR sensor stack~~ an antiferromagnetic layer formed on both sides of the in-stack biasing layer to provide an off-track bias layer.

12. (Currently Amended) The magnetic storage of claim 11, , further comprising lead layers formed on either side of the GMR sensor stack, wherein the lead layers comprises a layer of Rhodium disposed adjacent to the GMR sensor stack~~,~~ and a Tantalum layer formed over the layer of Rhodium ~~and a layer of Platinum-Manganese formed over the layer of Tantalum~~.

13. (Currently Amended) The magnetic storage of claim [[12]] 11, wherein the antiferromagnetic layer comprises a layer of Platinum-Manganese ~~is formed adjacent a portion of the in-stack bias layer~~.

14. (Currently Amended) The magnetic storage of claim 11, wherein the in-stack biasing layer comprises a bias layer formed only over the spacer and a coupling layer formed over the bias layer and the antiferromagnetic layer ~~of Platinum-Manganese~~.

15. (Currently Amended) The magnetic storage of claim 9, wherein the bias layer and the coupling layer each comprise a material selected from the group consisting of NiFe, CoFe, NiFeCr, ~~$NiFe_x$ and $CoFe_x$~~ NiFeX and CoFeX.

16. (Original) The magnetic storage of claim 9 further comprising a cap layer formed over the in-stack bias layer.

17. (Currently Amended) A method for providing a current-in-plane (CIP) GMR sensor with an improved in-stack bias layer with a thinner sensor stack, comprising;

forming a thin spin valve stack having a width selected to provide a predetermined track width;

forming a spacer over the spin valve stack, the spacer having a width substantially equal to the spin valve stack;

forming lead layers in a passive region outside the track;

forming, over the spacer, an in-stack bias layer having a width substantially equal to the width of the GMR sensor stack ~~over the spacer~~ for biasing a free-layer of the spin valve stack; and

forming a cap over the bias layer.

18. (Currently Amended) The method of claim 17, wherein forming the lead layers further comprises forming a layer of Rhodium disposed adjacent to the GMR sensor stack~~;~~ and forming a Tantalum layer formed over the layer of Rhodium ~~and a layer of Platinum-Manganese formed over the layer of Tantalum~~.

19. (Currently Amended) The method of claim [[18]] 17, wherein the forming of the in-stack bias layer comprises forming a layer of Platinum-Manganese ~~further comprises forming the layer of Platinum-Manganese adjacent a portion of the in-stack bias layer~~.

20. (Currently Amended) The method of claim [[18]] 17, wherein the in-stack bias layer comprises a bias layer formed only over the spacer and a coupling layer formed over the bias layer and the antiferromagnetic layer ~~of Platinum-Manganese~~.

21. (Currently Amended) The method of claim 17, wherein the forming of the bias layer and the coupling layer each further comprises using a material selected from the group consisting of NiFe, CoFe, NiFeCr, ~~$NiFe_x$ and $CoFe_x$~~ NiFeX and CoFeX.